

**CLAIMS:**

1. A coin projection device comprising a coin entry which leads to a coin validation unit, coins validated by the coin validation unit passing to a coin stack holder, coin ejection means being provided for pushing the bottom coin in the stack onto a coin projection runway, the device further comprising a firing mechanism for striking the edge of a coin on the runway to drive the coin along the runway thereby to project the coin.

2. A coin projection device as claimed in claim 1, wherein the coin validation unit is provided with a first sensor for detecting whether a coin has been entered and the runway is provided with a second sensor for detecting whether a coin is present on the runway, the coin ejection means being controlled automatically in dependence on the signals of the first and second sensors.

3. A coin projection device as claimed in claim 1 or 2, wherein the ejection means comprises a platform for supporting the coin stack, wherein the platform is slidable between a first position in which the coin stack is supported on the platform and a second position in which the coin stack is supported on a further, lower platform, and when the platform passes from the first position to the second position, the coin stack drops to the lower platform, and when the platform passes from the second position to the first position the lowest coin in the stack is pushed by the platform onto the coin projection runway.

4. A coin projection device as claimed in any of claims 1 to 3, wherein the firing mechanism comprises a hammer for striking an edge of the coin which overhangs the end of the runway.

5. A coin projection device as claimed in claim 4, wherein the hammer is drawn back manually against the action of a spring and is subsequently released to strike the coin.

6. A coin projection device as claimed in claim 5, wherein the hammer is retained in one of a plurality of possible drawn back positions by a ratchet mechanism, the ratchet mechanism being released to release the hammer.

7. A coin projection device as claimed in any of claims 1 to 6, wherein the runway comprises in series first and second portions having an abrupt direction change at the boundary.

8. A coin projection machine comprising a number of coin projection devices as claimed in any preceding claim, wherein the machine comprises a single manual control for operating simultaneously the firing mechanism of each device.

9. A coin projection machine as claimed in claim 8, comprising two coin projection devices.

10. An amusement machine comprising the combination of a coin projection

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device or coin projection machine as claimed in any of claims 1 to 9, and a playing surface onto which the coins are projected.

11. An amusement machine according to claim 10, in which the playing surface is segmented.

12. A coin magazine for a coin projection device, comprising a coin holder for holding a stack of coins and a platform for supporting the coin stack, wherein the platform is slidable between a first position in which the coin stack is supported on the platform and a second position in which the coin stack is supported on a further, lower platform, and when the platform passes from the first position to the second position, the coin stack drops to the lower platform, and when the platform passes from the second position to the first position the lowest coin in the stack is pushed by the platform onto a coin firing path.

13. A coin magazine according to claim 12, in which movement of the platform between the two positions is controlled by a solenoid, the moveable core of which is coupled to the platform by a link arm.

14. A coin magazine according to claim 13, in which the solenoid is arranged to provide movement of the platform away from the coin stack to the second position and a spring is provided to return the platform to the first position.

15. A coin magazine according to claim 13 or 14, in which actuation of the

~~solenoid is controlled in dependence on a sensor which determines whether or not a coin is present in the coin holder.~~

16. An article holding apparatus including means for clearing articles therefrom, the apparatus comprising a surface for supporting an array of articles; at least one aperture in the surface through which articles can pass; and a sweeper arm in sliding contact with the surface, whereby relative movement between the surface and the sweeper arm causes the sweeper arm to sweep at least part of the surface, and the sweeper arm having at least one U- or V-shaped indentation in its leading surface relative to sweeping movement, the indentation having an apex which is located so as to pass directly over one or more of the apertures in the surface, whereby the relative movement between the sweeper arm and the surface causes articles on the surface to be swept both in the sweeping direction and transversely to the sweeping direction, towards the apex of the indentation, where the articles are held until the apex passes over an aperture, whereupon the articles pass through the aperture.

17. An apparatus according to claim 16, in which the surface is a horizontal playfield of an amusement machine, and the articles are coins or tokens.

18. An apparatus according to claim 16 or 17, in which the surface is movable and the sweeper arm is static.

19. An apparatus according to claim 17 or 18, in which the surface is a

rotatable circular playfield, with at least two equally spaced radial sweeper arms.


20. An apparatus according to claim 19, in which each indentation has a shallow sloping side and a steep sloping side, the shallow sloping side being closer to the centre of the playfield.

21. An article holding apparatus comprising a surface defining a target field having an array of target areas at positions on the target field and a position encoder having a number of sensors, the target field and the or each sensor being adapted for relative movement to one another so that articles introduced onto the target field can be detected by a sensor, wherein the position encoder maintains a cyclical count and is arranged to determine whether or not an article detected by a sensor is within a target area on the target field with reference to a count value held by a counter.

22. An apparatus according to claim 21, in which the position encoder comprises a processor which maintains the count and has an associated memory which stores a look-up table for mapping count values to target field position for use in determining whether or not an article detected by a sensor falls within one of the target areas on the target field.

23. An apparatus according to claim 22, in which the processor is arranged to apply a correction factor when determining the position of an article on the target field with reference to a look-up table to compensate for any variation in

the speed of the relative movement between the target field and the or each sensor over time.

5  24. An apparatus according to any of claims 21 to 23, in which the or each sensor is associated with at least one dedicated look-up table which defines the circumferential limits of each target area capable of passing within the detection field of the sensor with respect to count value.

10 25. An apparatus according to any of claims 21 to 24, in which the position encoder counter is reset periodically in dependence on the relative positions of the target field and the or each sensor.

15 26. An apparatus according to any of claims 21 to 25, in which the or each sensor is an inductive field-type sensor.

27. An apparatus according to any of claims 21 to 26, in which the relative movement between the surface and the or each sensor is achieved by a combination of a movable playfield with one or more static sensors.

20 28. An apparatus according to any of claims 21 to 27, in which the relative movement between the surface and the or each sensor is achieved by a combination of a movable playfield with one or more movable sensors.

29. An apparatus according to any of claims 21 to 27, in which the relative

movement between the surface and the or each sensor is achieved by a combination of a static playfield with one or more movable sensors.

30. An apparatus according to any of claims 21 to 29, in which the surface comprises a rotatable playfield with at least two radially spaced sensors.

31. An apparatus according to claim 30, in which there are at least two equally circumferentially spaced sets of radially spaced sensors.

32. An amusement machine comprising an article holding apparatus according to any of claims 16 to 31.

33. An amusement machine comprising the combination of any two or more of the following;

a coin projection device as claimed in any of claims 1 to 9;

an article holding apparatus as claimed in any of claims 16 to 20; and

an article holding apparatus as claimed in any of claims 21 to 31.

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